JOURNEY INTO UNCHARTED TERRITORIES

How are owners, contractors and suppliers adapting to successfully execute projects and reposition their businesses in the ever evolving project environment?

September 7-10, 2011
JW Marriott Desert Ridge, Phoenix, AZ
New Playing Fields - Game Changer for the Capital Projects Business

TOM BUTTS
CH2MHyll

Program Co-Chair

JOURNEY INTO UNCHARTED TERRITORIES
PLENARY SESSION 1

REPOSITIONING THE PROJECTS BUSINESS IN A WORLD WITH CHANGING BOUNDARIES
ARS:

Are you currently involved in expanding your company’s operations or introducing new products into new regions of the world?

1. Yes 81%
2. No 19%
ARS:

From the choices provided, what is your biggest challenge when expanding into new regions?

1. Standardization of products and services 16%
2. Cultural differences 22%
3. Availability of a trained labor pool 36%
4. Safety 4%
5. Protection of intellectual property 12%
6. Other 10%
Investing in Projects in Shifting Markets

DR. VOLKER KNABE
President, Engineering & Maintenance, BASF SE

JOURNEY INTO UNCHARTED TERRITORIES
PLENARY SESSION 1

REPOSITIONING THE PROJECTS BUSINESS IN A WORLD WITH CHANGING BOUNDARIES
BASF - The Chemical Company
The world’s leading chemical company

- Our chemistry is used in nearly all industry sectors
- We combine economical success with social responsibility and the protection of the environment

- Sales 2010: €63,873 million
- EBIT 2010: €7,761 million
- Employees: 109,140 (December 31, 2010)

- Innovative strength:
  Leader in Patent Asset Index™
  (1,100 new patents filed)

- 6 Verbund sites and about 390 production sites
### BASF segments

<table>
<thead>
<tr>
<th>Chemicals</th>
<th>Plastics</th>
<th>Performance Products</th>
<th>Functional Solutions</th>
<th>Agricultural Solutions</th>
<th>Oil &amp; Gas</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inorganics</td>
<td>Performance Polymers</td>
<td>Dispersions &amp; Pigments</td>
<td>Catalysts</td>
<td>Crop Protection</td>
<td>Oil &amp; Gas</td>
<td></td>
</tr>
<tr>
<td>Petro-chemicals</td>
<td>Poly-urethanes</td>
<td>Care Chemicals</td>
<td>Construction Chemicals</td>
<td>Coatings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediates</td>
<td></td>
<td>Nutrition &amp; Health</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Paper Chemicals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Performance Chemicals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Chemicals:** 18%
- **Plastics:** 16%
- **Performance Products:** 19%
- **Functional Solutions:** 15%
- **Agricultural Solutions:** 6%
- **Oil & Gas:** 17%
- **Others:** 9% Sales
BASF’s global technical community

Replacement value ~ 60 billion €
2-3 billion € p.a. investments …
1.7 billion € p.a. maintenance …

Know-how:

• Worldwide unique engineering & maintenance network
• Global Technical Community: more than 13,500 employees worldwide
• Profound and broad technical know-how: 19 centers of technical expertise
• In house technological research and development
• Consulting and operational competence
• Third party business
Investment Projects in Shifting Markets: trends to be considered

• Customer industries still moving to the East but less pronounced
• Considerable differences in regional growth rates around the world
• Increased volatility in investment markets
• More mega projects to come but at the same time smaller “just in time” production modules needed
• More localization of engineering & procurement capabilities in Asia Pacific
• Current investment demand exceeds owner’s engineering capabilities
• Energy and climate change discussions impact investment decisions
Shift of Customer Industries towards Asia ...

Gross Total Value Added / billion $

<table>
<thead>
<tr>
<th>Year</th>
<th>South America, Africa, Middle East</th>
<th>North America</th>
<th>Europe</th>
<th>Asia Pacific</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>9,008</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>10,694</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>11,965</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>12,100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>20,001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Industry, source: BASF SE, Strategic Planning
... and the chemical market follows

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Industry, source: BASF SE, Strategic Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>1,307</td>
</tr>
<tr>
<td>2000</td>
<td>1,293</td>
</tr>
<tr>
<td>2005</td>
<td>1,950</td>
</tr>
<tr>
<td>2009</td>
<td>2,367</td>
</tr>
<tr>
<td>2020</td>
<td>5,732</td>
</tr>
</tbody>
</table>

- South America, Africa, Middle East: 25% (1995), 28% (2000), 32% (2005), 33% (2009), 30% (2020)
- North America: 38% (1995), 33% (2000), 33% (2005), 38% (2009), 38% (2020)
- Europe: 29% (1995), 30% (2000), 33% (2005), 30% (2009), 20% (2020)
- Asia Pacific: 26% (1995), 21% (2000), 21% (2005), 21% (2009), 56% (2020)
Shifts in investment volume 1980 - 2020...

Investment focus outside Europe at BASF

1980 – 2000

> 2005

> 2000

> 2015 – 2020
Be prepared for more volatility in investment markets

We still remember!

Price index 2002 = 100

- US GC
- China
- Germany
ARS:

Considering the current economic development and taking into account the depth crisis in certain regions as well as political unrest in e.g. North Africa, what are your expectations for the price index in the investment markets for the next five years to come?

1. No significant change compared to 2010/2011 - 42%
2. Further price reductions like 2008/2009 due to early signals of recessions - 24%
3. New boom in 2012 with high price increases, comparable to 2005/2006 - 34%
Be prepared for more volatility in investment markets

What's ahead?

Price index 2002 = 100

- US GC
- US GC Boom
- US GC Recession
- China
- China Boom
- China Recession
- Germany
- Germany Boom
- Germany Recession
More Mega Projects to come ...

e. g. continued trend in Middle East:
• Countries have developed their “Visions”
• Limited window of opportunities; speed!
• Interest in downstream activities and access to markets outside of home region
• Balance between “discounts” and WTO restrictions

e.g. China:
• “moving West”
• Growth rates demand world scale plants

e.g. North America:
• Shale gas exploration and downstream activities?
• New smaller markets to be developed
• Trade restrictions
• Desire for lower inventories
• Shorter lifecycle time for specialty chemicals

→ Need for new modularized plants at specific investment costs comparable to world scale plants
Most western companies are not fully exploiting the potential improvements in capital projects in China

Many EPC contractors have build-up large offices with local people but they still do not think Chinese

How do your projects compare to benchmarks like:

<table>
<thead>
<tr>
<th>Type of plant</th>
<th>Average investment</th>
<th>Average time to finish project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>USD/KW, USD/MT, USD millions/kbpd</td>
<td>Month</td>
</tr>
<tr>
<td>Coal-fired power plant</td>
<td>Asia</td>
<td>Developed market</td>
</tr>
<tr>
<td></td>
<td>500 - 1,000</td>
<td>1,450</td>
</tr>
<tr>
<td>Petroleum refinery</td>
<td>Asia</td>
<td>Developed market</td>
</tr>
<tr>
<td></td>
<td>8 - 15</td>
<td>18 - 20</td>
</tr>
</tbody>
</table>

McKinsey analysis in different industries
Potentials to improve investment projects:

**Technology**
- Adjust technologies to assure fit-for-purpose design and avoid over-specifications

**Procurement**
- Local suppliers are encouraged to offer alternatives
- Development of local suppliers via partnerships
- Adapt specifications to local/supplier conditions (broader supplier base)
- Challenge restricted vendor lists

Example for investment in China (study)

<table>
<thead>
<tr>
<th>Copy existing plant</th>
<th>Lean process</th>
<th>Lean process regionalized design concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>324</td>
<td>215</td>
<td>165</td>
</tr>
</tbody>
</table>

Competitiveness of investments in emerging markets requires more localization - Example China (2/3)
Competitiveness of investments in emerging markets requires more localization - Example China (3/3)

• Maximize saving potentials from Asian equipment market for projects in Asia and outside

• Early transfer of planning activities to Asia to apply localized plant design concepts

• Increase use of Asian engineering resources

![Cost difference for equipment, ex works](chart1)

![Machines & Equipment exports from China](chart2)
Shift in project load: From crisis to investment wave

Industry trend

• Backlog of investment projects due to financial crisis and underestimated recovery

Investment activities

± 25% flexibility
(in-house resources + local contractors + EPC companies)

Example BASF (w/out Oil & Gas)
Challenges for EPC Contractors and Suppliers

- More focus on process engineering / conceptional planning support via engineering partnership
- Push for increased local content; a “must” for owner’s as well
- Sufficient presence in fast growing markets (incl. required licenses) and enhanced global reach
- Differentiation by sophisticated market intelligence (sourcing)
- Advanced IP protection strategy
Shift in energy policy/climate change triggers new pattern of competition between regional/global sites

Energy

• Current uncertainty of long term power supply / pricing for process industries and their related customers, e.g.
  – phasing out of nuclear energy,
  – expansion in renewable energy,
  – climate change consequences

Emission Trading e. g. Europe

• Advantages for production sites outside of trading zones
• Energy efficient technologies get a new push
Summary

- Continued focus on developing markets in Asia Pacific
- Expect more to come from Middle East
- Localization of resources is a prerequisite for fully capitalizing potentials in Asia/Pacific
- Current capital projects forecast provides new opportunities for EPC companies/suppliers but bears the risk of volatile investment markets
- Energy and climate change discussions are to be closely watched
It’s up for discussion!
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